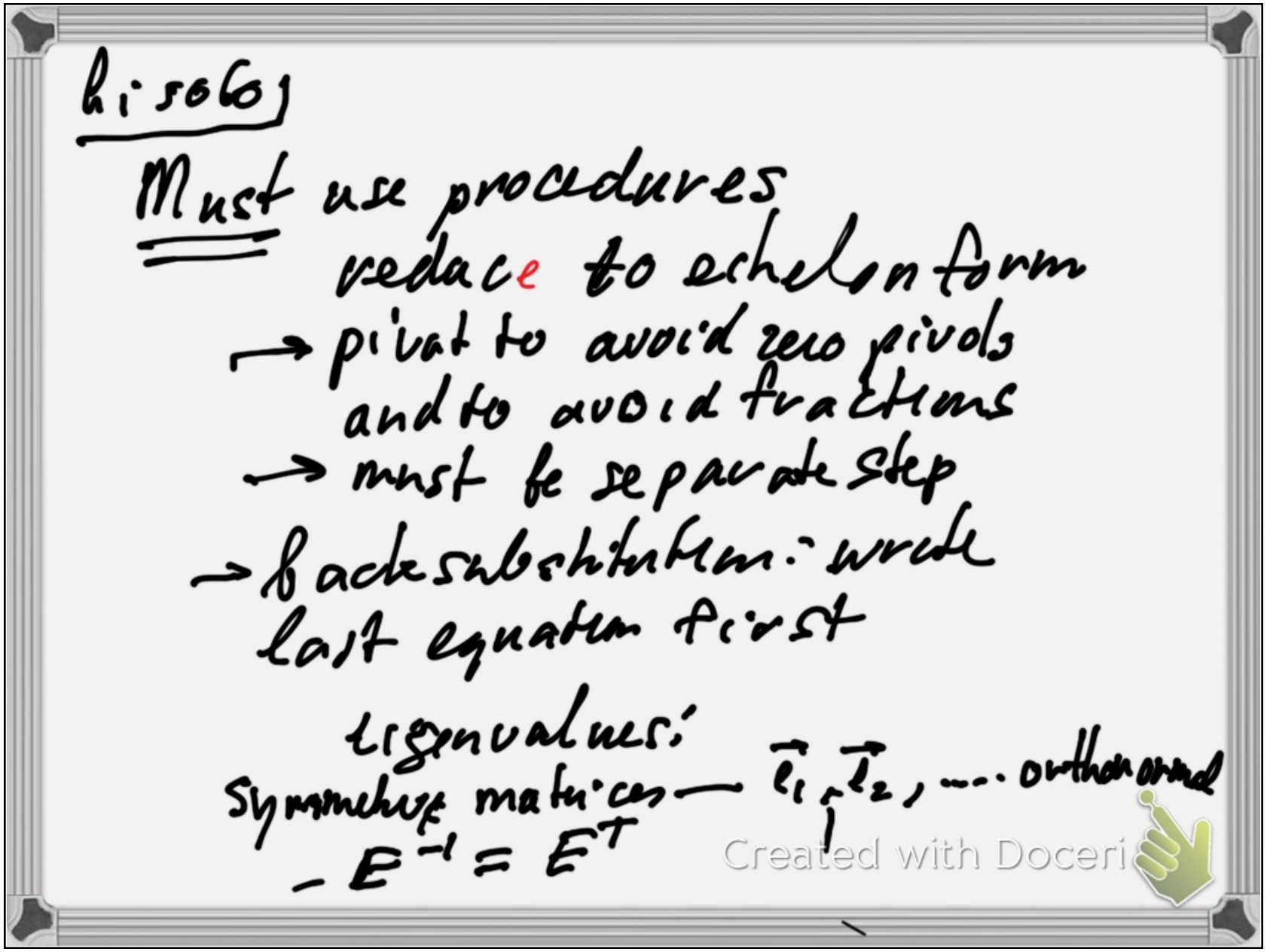
h:506)
Must use procedures
reduce to echelon form
→ pivot to avoid zero pivots
and to avoid fractions
→ must be separate step
→ back substitution: work
last equation first
eigenvalues:
Symmetric matrices — $\vec{e}_1, \vec{e}_2, \ldots$ orthonormal
$E^{-1} = E^T$
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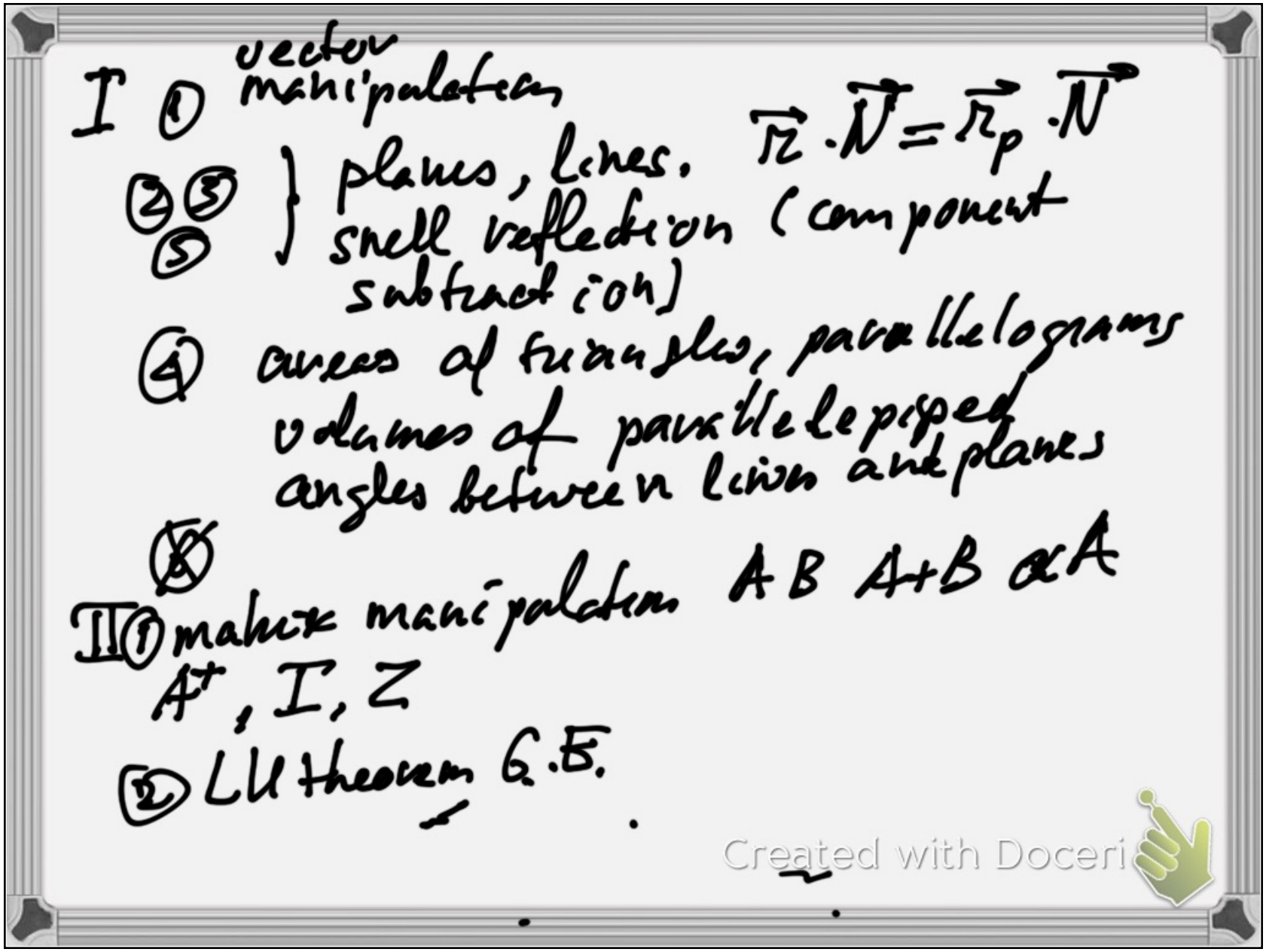
~~Aim~~ Quadratic forms,
must show x'y' plane first
then xy plane

Violations
- multiply a row by number
- swap rows and one is not the first row of the current submatrix
- swap two in a submatrix
- solve for anything else than the pivot unknown
- do not show basis vectors

do not reduce to echelon form

$$\begin{bmatrix} 0 & 1 & 2 & 3 & 4 & 2 \\ 0 & 0 & 3 & 5 & 6 & 3 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 \end{bmatrix}$$

- undetermined constants in eigenvectors


I ① vector manipulation
② ③ ⑤ } planes, lines. shell reflection (component subtraction)
$\vec{\pi} \cdot \vec{N} = \vec{\pi}_p \cdot \vec{N}$
④ areas of triangles, parallelograms volumes of parallelepiped angles between lines and planes
⑥
II ① matrix manipulation AB A+B αA
A^t, I, Z
② LU theorem G.E.
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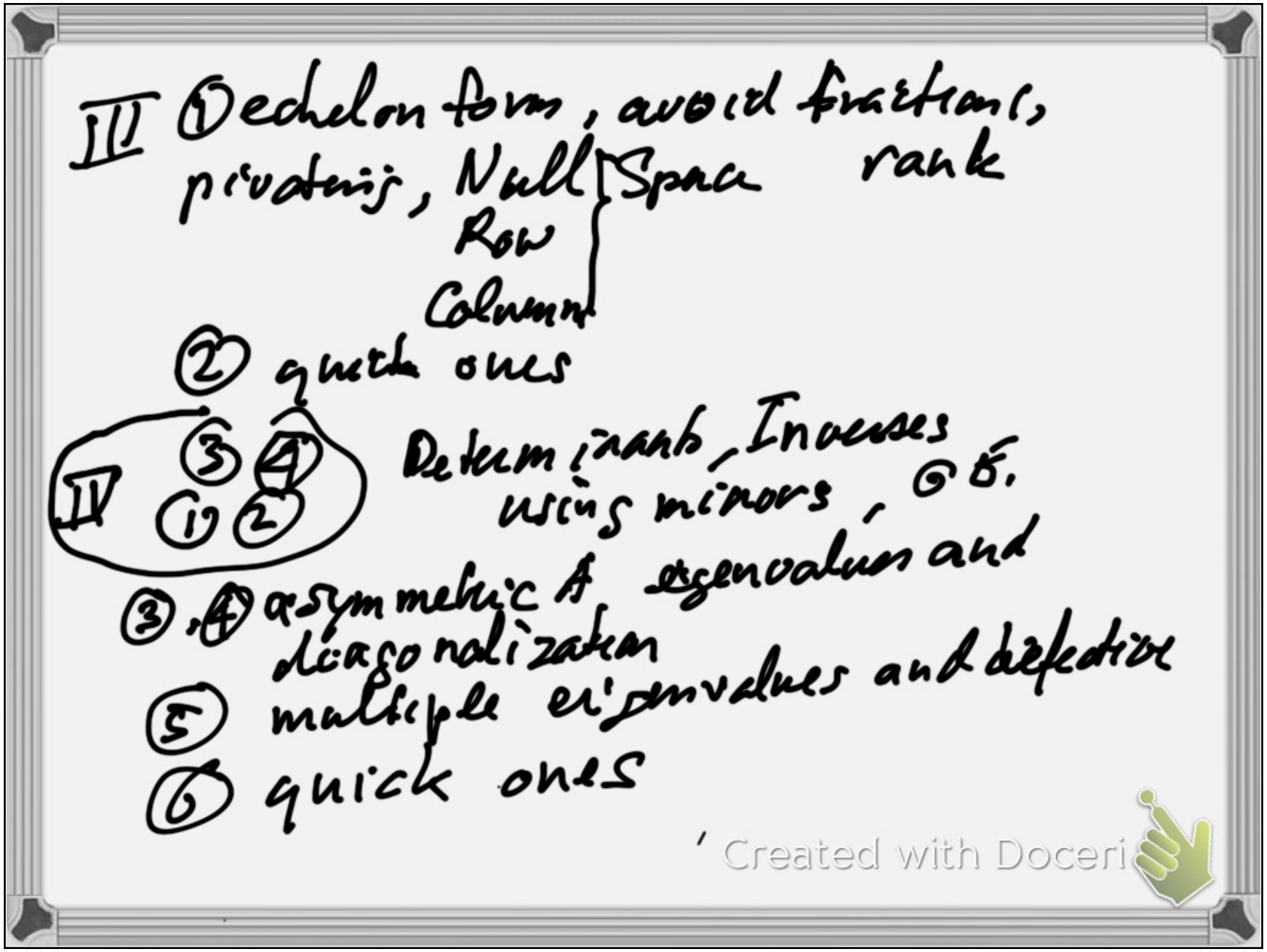
III ① echelon form, avoid fractions, rank
privateis, Null Space
Row
Column
② quick ones
IV ③ ④ ① ② Determinants, Inverses using minors, ⊙ ⊖.
③, ④ asymmetric A eigenvalues and diagonalization
⑤ multiple eigenvalues and defective
⑥ quick ones
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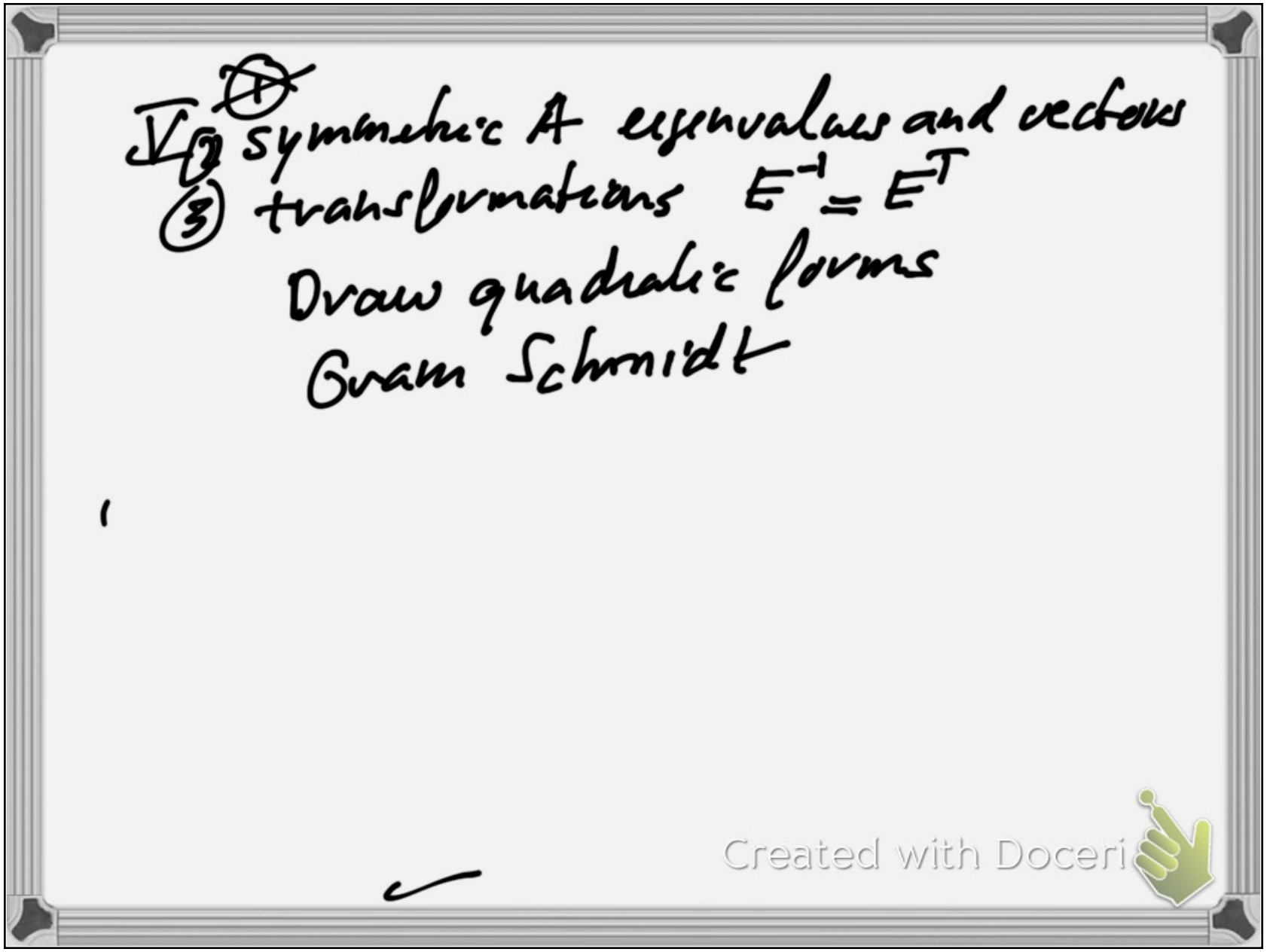

symmetric A eigenvalues and vectors
transformations $E^{-1} = E^T$
Draw quadratic forms
Gram Schmidt
Created with Doceri

$a, b > 0$

$$a x'^2 - b y'^2 = c$$

$$b y'^2 = a x'^2 + d$$

$$y'^2 = \frac{a}{b} x'^2 + \frac{d}{b}$$

$$y' = \pm \sqrt{\frac{a}{b} x'^2 + \frac{d}{b}}$$

large x'

$$y' \sim \pm \underbrace{\sqrt{\frac{a}{b}}}_{m} x'$$

$$\frac{dy'}{dx'} = m = \tan\alpha$$

$$\alpha = \arctan\left(\pm \sqrt{\frac{a}{b}}\right)$$

$A = \begin{pmatrix} 2 & 1 & 1 \\ 1 & 2 & 1 \\ 1 & 1 & 2 \end{pmatrix}$ $A - \lambda I$ $\begin{pmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{pmatrix}$

A_{non} → non defective → n different eigenvectors
→ n eigenvalues
if all n different → non defective
repeated eigenvalues

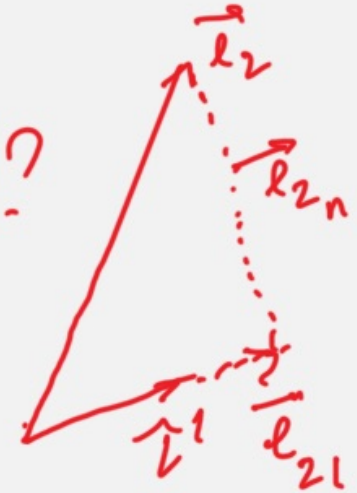
double eigenvalue

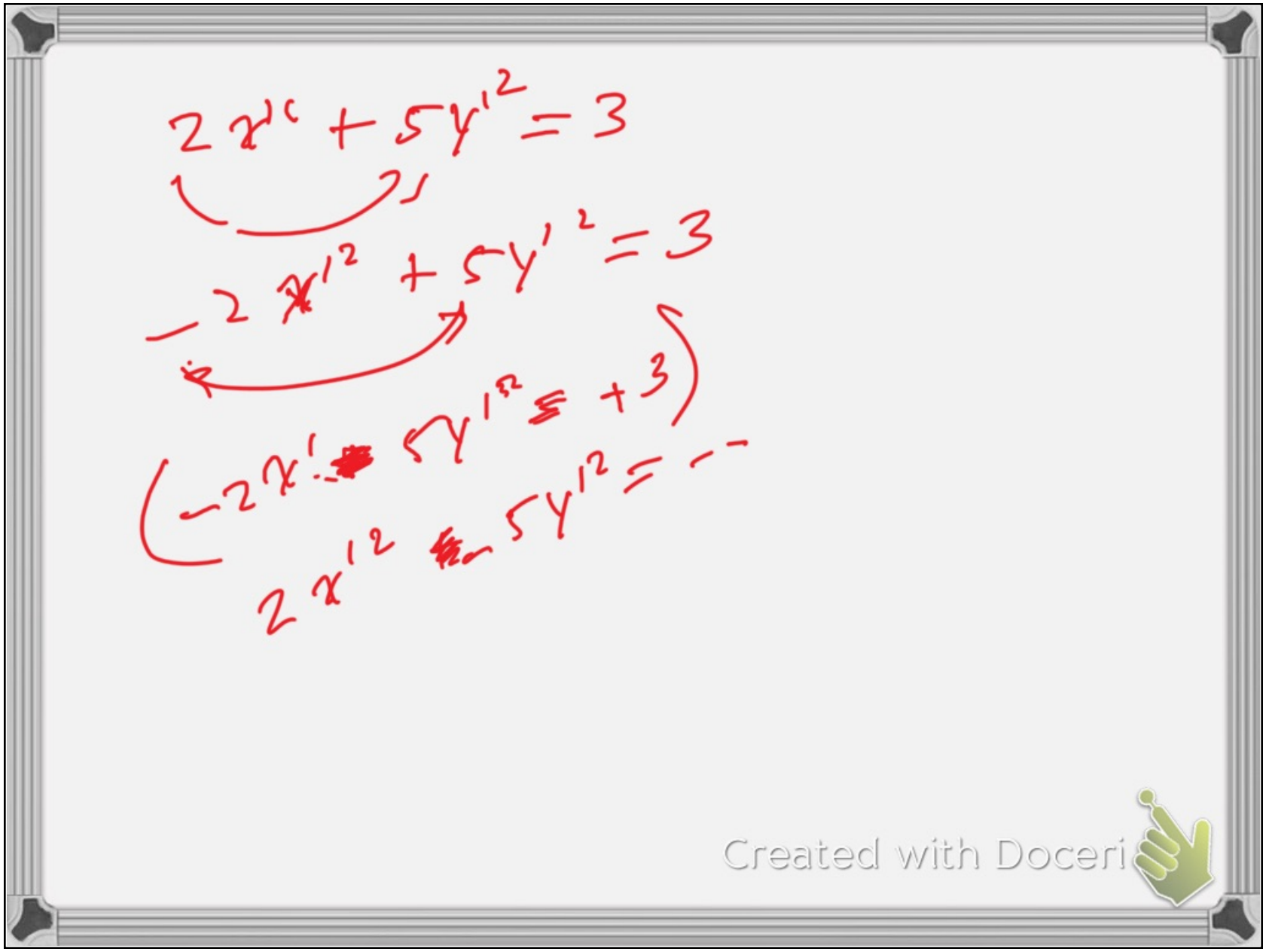
$\Rightarrow \vec{e}_1, \vec{e}_2 \rightarrow \vec{e}_2$??

$\hat{i}^1 = \dfrac{\vec{e}_1}{|\vec{e}_1|}$

$\vec{e}_{2n} = \vec{e}_2 - \hat{i}^1 (\vec{e}_2 \cdot \hat{i}^1)$

$\hat{j}^1 = \vec{e}_{2n} / |\vec{e}_{2n}|$




$2x^{12} + 5y^{12} = 3$
$-2x^{12} + 5y^{12} = 3$
$(-2x^{12} + 5y^{12} = +3)$
$2x^{12} - 5y^{12} = --$
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